REMARKS

Applicants thank the Examiner for withdrawing the title objection of record in the July 17, 2003 *Office Action.*

Applicants thank the Examiner for withdrawing the 35 U.S.C. § 102 rejection of dependent claims 2 and 6 of record in the July 17, 2003 *Office Action.*

Status of the Application

Claims 1-8 and 15-17 are all the claims pending in the Application. Claims 1, 3-5, 7, 8, 15 and 17 stand rejected.

Allowable Subject Matter

Applicants thank the Examiner for indicating that claims 2, 6 and 16 would be allowable if rewritten in independent form, and that claim 4 would be allowable if rewritten in independent form and to overcome the 35 U.S.C. § 112 rejection discussed below.

Indefiniteness Rejection

The Examiner has again rejected claims 3, 4 and 7 as being indefinite under 35 U.S.C. § 112, second paragraph, taking the position that "it is unclear to the Examiner what the foil's pre-pinch seal dimensions are."

In the January 20, 2004 Amendment, Applicants pointed out that the foil's "pre-pinch seal dimension" could be any value, as long as the foil provided in arc tube body "is elongated no more than 15%" of that dimension. Further, Applicants directed the Examiner to *at least* paragraph 0016 of the Application, which explains that the elongation of the foil generated by the pinch seal is set to 15% or less in order to effectively suppress the generation of foil tearing.

However, the Examiner alleges that "paragraph [0016] is still vague on what the pinch seal dimensions are." The Examiner then proposes that Applicants recite the foil's dimensions in terms of the pinch seal dimensions A and B discussed in paragraph 0015.

Applicants respectfully disagree.

First, the dimensions A and B are pinch seal dimensions, not foil dimensions.

Second, it is clear from the Application as filed that, a foil has: (1) a pre-pinch seal dimension before it is joined with the arc tube in a pinch seal; and (2) that that dimension is elongated after it is joined with the arc tube in the pinch seal. The Application clearly indicates that the foil's elongated dimension is no more than 15% of the pre-pinch seal dimension, in order to prevent foil tearing (par. 0016). The particular measured dimension is not limited by the Application, and can be read as any one of a length, width, etc. along the surface of the foil that is elongated by pinch sealing.

Thus, as the Application itself does not limit the dimension to any particular direction (*e.g.*, a length or width along the surface of the foil), the Examiner should not require amendment of claim 3 to recite such features.

Thus, Applicants respectfully request the withdrawal of this rejection.

Claim Rejections

The Examiner has rejected claims 1, 3 and 8 under 35 U.S.C. § 102(e) as being anticipated by *Horiuchi et al.* (US 6,368,175 B1; hereinafter "*Horiuchi*"), and claims 5, 7, 15 and 17 under 35 U.S.C. § 103(a) as being unpatentable over *Horiuchi* in view of *Irisawa et al.* (US 5,962,976; hereinafter "*Irisawa*"). These rejections are respectfully traversed.

Independent Claim 1

Regarding claim 1, the Examiner takes the position that FIG. 1 of *Horiuchi* shows all of the features of claim 1, including "molybdenum foil joined with the arc tube body by a pinch seal" and that the arc tube body has "a compressive stress of 10^5 N/m^2 or more along a junction surface with the foil at an ordinary temperature" (Office Action, numbered paragraph 7).

Applicants respectfully disagree.

As previously discussed, *Horiuchi* discloses an arc tube (see FIG. 1) with a spherical light emitting portion 1, sealing portions 2a and 2b, tungsten discharge electrodes 3, molybdenum foil 4, and lead wire 5. Sealing portions 2a and 2b are formed by heating and softening the straight tube portion until it makes contact with the electrode assembly 6 and seals it (see col. 11, lines 5-8, col. 13, lines 41-49, col. 15, lines 6-39), thereby providing a residual compressive stress in the quartz glass near the interface with the electrodes of 25 MPa (25,000,000 N/m^2) or more. (See col. 8, lines 2-3).

This heating and softening process is not a pinch-sealing process, and thus sealing portions 2a and 2b in *Horiuchi's* arc tube are not pinch seals. Thus, it cannot reasonably be argued that the arc tube of *Horiuchi* provides "a foil joined with the arc tube body by pinch seal," as there is no "pinch seal" in *Horiuchi*.

Further in this regard, the Examiner's allegation that Applicants are merely arguing that the processes of *Horiuchi* and the Application are not the same is incorrect. Although the differences in processes are clear, Applicant's argument is also directed to the lack of any "pinch seal" in *Horiuchi*, at least as recited in independent claim 1 of the instant Application.

Additionally, Applicants respectfully submit that the very high residual compressive stress of 25 MPa (25,000,000 N/m^2) or more in the sealing portions 2a and 2b is directly attributable to the disclosed heating and sealing process, and would actually be too high for use in the pinch seal of claim 1.[1]

Further, Applicants respectfully submit that the residual compressive stress value disclosed by *Horiuchi* is specifically indicated as being at the interface of electrodes and the quartz glass. This is not the same as the configuration recited in independent claim 1, which specifies that the compressive stress is "along a junction surface with the foil" (emphasis added).

This difference is clearly illustrated in the vastly different reasons for the provision of the respective compressive stresses. Specifically, *Horiuchi* discloses that its compressive stress is provided to prevent "metal halide from entering the vicinity of the interface between the glass and the electrodes 3 being low in temperature, and also prevents the vapor pressure of the metal halide from lowering, thereby improving the light-emitting characteristic of the lamp" (col. 8, lines 4-12). In contrast, the compressive stress recited in the instant Application is related to, *inter alia*, the prevention of peeling of the recited foil.

For at least the above reasons, Applicants respectfully request the withdrawal of this rejection.

[1] Additionally, Applicants note that the compressive force used in *Horiuchi* would provide cracks with very different features from those contemplated by the invention. For example, the larger stress crack of *Horiuchi* must be measured by a sensitive color plate, while a smaller crack must be measured by using a birefringence measurement system or a polarization compensation method.

Dependent Claims 5-7

Regarding claims 5-7, the Examiner has taken the position that *Horiuchi* discloses almost all of the features of these claims, except that it does not teach or suggest "a plurality of cracks formed at the junction surface of the foil and the arc tube body, wherein a maximum depth of the cracks is 50% or less of a thickness of the molybdenum foil." (Office Action, par. 15). Applicants agree that *Horiuchi* is deficient at least in this regard.

In an attempt to show such a feature, the Examiner relies on *Irisawa*, citing col. 5, lines 3-14 and alleging that one of skill would have modified *Horiuchi* in view of *Irisawa* to increase "the junction strength of the foil and the arc tube body."

However, Applicants respectfully submit that one of skill would not have been motivated to modify *Horiuchi* as the Examiner alleges. Specifically, *Horiuchi* discloses a heating and melting process to form seal portions 2a and 2b and provide a residual compressive stress. In contrast, *Irisawa* discloses a pinch seal process to form pinch seals 4. Applicants respectfully submit that these are two different processes, and that one of skill would not have been motivated to modify *Horiuchi* as alleged by the Examiner, as such a modification would have completely changed its disclosed manufacturing process (heating and melting).

In this regard, it has long been held that, if "the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) MPEP § 2143.01.*

Additionally, even if these references could have been combined as the Examiner alleges, Applicants respectfully submit that such a combination would fail to teach or suggest all of the features recited in claims 5-7.

Specifically, Applicants respectfully submit that *Irisawa* fails to teach or suggest any "cracks" in the molybdenum foil 5. In fact, *Irisawa* only discloses that there is an "irregular interface" between the glass and the foil (see col. 5, line 6). This irregular interface fails to teach or suggest the "cracks" recited in claims 5-7.

In fact, in paragraph 22 of the Office Action, the Examiner seems to concede that Applicants' reading of *Irisawa's* irregular interface is correct. However, the Examiner then argues that *Irisawa* "also discloses that those fine irregularities serve to minimize the development of cracks (col. 5, lines 15-22). Thus, the Examiner holds that Irisawa does indeed teach cracks and a method of minimizing them" (O.A., par. 22).

However, Applicants respectfully submit that these cracks cited by the Examiner are cracks in the glass of *Irisawa*, not the foil. Applicants respectfully submit that these glass cracks are irrelevant to the recited "cracks" in the molybdenum foil, and therefore do not support the Examiner's rejection.

Further, Applicants respectfully submit that, even if some portion of *Irisawa* could be broadly interpreted as suggesting a "crack," *Irisawa* fails to teach or suggest any specific relationship between such a feature and the thickness of the foil, as *Irisawa* is silent regarding any specific thickness of the foil 5.

Thus, Applicants respectfully request that the Examiner withdraw the above rejections.

Conclusion

In view of the foregoing, it is respectfully submitted that claims 1-8 and 15-17 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1-8 and 15-17.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,

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